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IEEE Standard Dictionary of Electrical and Electronics Terms

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Calibration factor and effective efficiency are related as in the equation above, where K_b, η_c and Γ are the calibration factor, effective efficiency and reflection coefficient of the electrothermic unit, respectively. (B) The reference frequency is to be supplied with the calibration factor. 47
(4) (electrothermic-coupler unit). The ratio of the substituted reference power (dc, audio, or rf) in the electrothermic unit attached to the side arm of the directional coupler to the power incident upon a nonreflecting load connected to the output port of the main arm of the directional coupler for the same dc output voltage from the electrothermic unit is attached to the main arm of the directional coupler, the calibration factor is the ratio of the substituted reference (dc, audio, or rf) power in the electrothermic unit attached to the main arm of the directional coupler to the power incident upon a nonreflecting load connected to the output port of the side arm of the directional coupler for the same dc output voltage from the electrothermic unit at a prescribed temperature. *Note:* The reference frequency is to be supplied with the calibration factor. 47

calibration interval, period or cycle (test, measurement, and diagnostic equipment). The maximum length of time between calibration services during which each standard and test and measuring equipment is expected to remain within specific performance levels under normal conditions of handling and use. 42

calibration level (signal generator). The level at which the signal generator output is calibrated against a standard. *See:* **signal generator.** 185

calibration marks (navigation aid terms)(radar). Indications superimposed on a display to provide a numerical scale of the parameters displayed. 526, 13

calibration or conversion factor (calibration) (loosely called antenna factor). The factor or set of factors that, at given frequency, expresses the relationship between the field strength of an electromagnetic wave impinging upon the antenna of a field-strength meter and the indication of the field-strength meter. *Note:* The composite of antenna characteristics, balun and transmission line effects, receiver sensitivity and linearity, etcetera. *See:* **measurement system.** 213

calibration procedure (test, measurement and diagnostic equipment). A document which outlines the steps and operations to be followed by standards and calibration laboratory and field calibration activity personnel in the performance of an instrument calibration. 54

calibration programming (power supplies). Calibration with reference to power-supply programming describes the adjustment of the control-bridges current to calibrate the programming ratio in ohms per volt. *Note:* Many programmable supplies incorporate a calibrate control as part of the reference resistor that performs this adjustment. 228,186

calibration scale (power switchgear). A set of graduations marked to indicate values of quantities , such as current, voltage, or time, at which an automatic device can be set to operate. 103

calibration voltage. The voltage applied during the adjustment of a meter. *See:* **test (instrument or meter).** 212

calibrator (oscilloscopes). The signal generator whose output is used for purposes of calibration, normally either amplitude or time or both. 106

caliche (cable plowing). Common sedimentary rock normally formed from ancient marine life. 52

call (1) (communications) (computers). The action performed by the calling party, or the operations necessary in making a call, or the effective use made of a connection between two stations. 255
(2) (telephone switching systems). A demand to set up a connection. 55

call announcer (automatic telephone office). A device for receiving pulses and audibly reproducing the corresponding number in words so that it may be heard by a manual operator. 328

call circuit (manual switching). A communication circuit between switching points used by the traffic forces for the transmission of switching instructions. 328

called-line release (telephone switching systems). Release under the control of the line to which the call was directed. 55

call forwarding (telephone switching systems). A feature that permits a customer to instruct the switching equipment to transfer calls intended for his station to another station. 55

call indicator. A device for receiving pulses from an automatic switching system and displaying the corresponding called number before an operator at a manual switchboard. 328

calling device (telephone switching systems). An apparatus that generates the signals required for establishing connections in an automatic switching system. 55

calling line identification (telephone switching systems). Means for automatically identifying the source of calls. 55

calling-line release (telephone switching systems). Release under the control of the line from which the call originated. 55

calling-line timed release (telephone switching systems). Timed release initiated by the calling line. 55

calling plug and cord. A plug and cord that are used to connect to a called line. 328

calling sequence (computers). A specified arrangement of instructions and data necessary to set up and call a given subroutine. 255,77

call packing (telephone switching systems). A method of selecting paths in a switching network according to a fixed hunting sequence. 55

call rate (telephone switching systems). The number of calls per unit of time. 55

call splitting (telephone switching systems). Opening the transmission path between the parties of a call. 55

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coin tone (telephone switching systems). A class-of-service tone that indicates to an operator that the call has originated from a coin telephone. 55

cold cathode. A cathode that functions without the application of heat. *See:* **electrode (electron tube).** 328

cold-cathode glow-discharge tube (glow tube). A gas tube that depends for its operation on the properties of a glow discharge. 190

cold-cathode lamp (illuminating engineering). An electric-discharge lamp whose mode of operation is that of a glow discharge, and which has electrodes so spaced that most of the light comes from the positive column between them. 167

cold-cathode stepping tube (electron device). A glow discharge tube having several main gaps with or without associated auxiliary gaps, and in which the main discharge has two or more stable positions and can be made to step in sequence, when a suitable shaped signal is applied to an input electrode, or a group of input electrodes. 190

cold-cathode tube. An electron tube containing a cold cathode. 125

cold-end termination (CET)(electrical heat tracing for industrial applications). The termination applied to the end of a heating cable where the power is supplied. 523

cold lead (electrical heat tracing for industrial applications). An electrically insulated conductor used to connect a heating conductor to the branch-circuit conductors and designed so as not to produce any appreciable heat. 523

cold reserve. Thermal generating capacity available for service but not maintained at operating temperature. 64

cold side. *See:* **unexposed side.** 368

cold test (test, measurement and diagnostic equipment). *See:* **passive test.**

collapsing loss (radar). Loss of information, measured by an increase in required input signal-to-noise ratio, occurring when envelope-detected noise from resolution elements not containing the signal is added to the signal during processing; for example; it occurs when radar returns containing range, azimuth, and elevation information are constrained to a two dimensional display. 13

collapsing ratio (radar). The total number of envelope detected noise samples added to the signal divided by the number which originated in the resolution cell containing the signal. 13

collar (cheek, field-coil flange) (washer) (rotating machinery). Insulation between the field coil and the pole shoe (top collar) and between the field coil and the member carrying the pole body (bottom collar). *See:* **rotor (rotating machinery).** 63

collate. To compare and merge two or more similarly ordered sets of items into one ordered set. 255,77

collating sequence. An ordering assigned to a set of items, such that any two sets in that assigned order can be collated. 255,77

collator. A device to collate sets of punched cards or other documents into a sequence. 255,77

collect call (telephone switching systems). A call for which the called customer agrees to pay. 55

collection efficiency (quantum yield). The number of carriers crossing the p-n junction per incident photon. 113

collector (1) (rotating machinery). An assembly of collector rings, individually insulated, on a supporting structure. *See:* **asynchronous machine.** 63
(2) (electron tube). An electrode that collects electrons or ions that have completed their functions within the tube. *See:* **electrode (electron tube).** 125
(3) (transistor). A region through which primary flow of charge carriers leaves the base. 245

collector grid (solar cells). A pattern of conducting material making ohmic contact to the active surface of a solar cell to reduce the series resistance of the device by reducing the mean path of the current carriers within the semiconductor. 113

collector junction. *See:* **junction, collector.**

collector plates. Metal inserts embedded in the cell lining to minimize the electric resistance between the cell lining and the current leads. *See:* **fused electrolyte.** 328

collector ring (slip ring). A metal ring suitably mounted on an electric machine that (through stationary brushes bearing thereon conducts curent into or out of the rotating member. *See:* **asynchronous machine.** 328

collector-ring (slip-ring) lead insulation (rotating machinery). Additional insulation, applied to the leads that connect the collector rings to the windings of the rotating member, to prevent grounding to the metallic parts of the rotating members, and to provide electrical separation between leads. *See:* **rotor (rotating machinery).** 63

collector-ring (slip-ring) shaft insulation (rotating machinery). The combination of insulating members that insulate the collector rings from the parts of the structure that are mounted on the shaft. *See:* **rotor (rotating machinery).** 63

collector rings (National Electrical Code). A collector ring is an assembly of slip rings for transferring electrical energy from a stationary to a rotating member. 256

collimate (storage tubes). To modify the paths of electrons in a flooding beam or of various rays of a scanning beam in order to cause them to become more nearly parallel as they approach the storage assembly. *See:* **storage tube.** 174

collimated beam (laser-maser). Effectively, a parallel beam of light with very low divergence or convergence. 363

collimating lens (storage tubes). An electron lens that collimates an electron beam. *See:* **storage tube.** 174

collimation (fiber optics). The process by which a divergent or convergent beam of radiation is converted into a beam with the minimum divergence possible for

encapsulated (rotating machinery). A machine in which one or more of the windings is completely encased by molded insulation. *See:* **asynchronous machine.** 63

encapsulation (1)(of a semiconductor radiation detector)(germanium gamma-ray detectors). The packaging of a detector for protective or mounting purposes, or both. 528

(2) (software). The technique of isolating a system function within a module and providing a precise specification for the module. *See:* **information hiding; module; specification; system function.** 434

enclosed (NESC). Surrounded by case, cage, or fence designed to protect the contained equipment and minimize the possibility under normal conditions of dangerous approach or accidental contact by persons or objects. 494

enclosed brake (industrial control). A brake that is provided with an enclosure that covers the entire brake, including the brake actuator, the brake shoes, and the brake wheel. *See:* **electric drive.** 225,206

enclosed capacitor (shunt power capacitors). A capacitor having enclosed terminals. The enclosure is provided with means for connection to a rigid or flexible conduit. 138

enclosed cutout (power switchgear). A cutout in which the fuse clips and fuseholder or disconnecting blade are mounted completely within an insulating enclosure. 103, 443

enclosed relay. A relay that has both coil and contacts protected from the surrounding medium. *See:* **relay.** 259

enclosed self-ventilated machine (electric installations on shipboard). A machine having openings for the admission and discharge of the ventilating air, which is circulated by means integral with the machine, the machine being otherwise totally enclosed. These openings are so arranged that inlet and outlet ducts or pipes may be connected to them. Such ducts or pipes, if used, must have ample section and be so arranged as to furnish the specified volume of air to the machine, otherwise the ventilation will not be sufficient. 3

enclosed separately ventilated machine (electric installations on shipboard). A machine having openings for the admission and discharge of the ventilating air, which is circulated by means external to and not a part of the machine, the machine being otherwise totally enclosed. These openings are so arranged that inlet and outlet duct pipes may be connected to them. 3

enclosed switch (industrial control) (safety switch). A switch either with or without fuse holders, meter-testing equipment, or accommodation for meters, having all current-carrying parts completely enclosed in metal, and operable without opening the enclosure. *See:* **switch.** 206

enclosed switchboard (power switchgear). A dead-front switchboard that has an overall sheet metal enclosure (not grille) covering back and ends of the entire assembly. *Note:* Access to the interior of the enclosure is usually provided by doors or removable covers. The top may or may not be covered. 103

enclosed switches (indoor or outdoor) (power switchgear). Switches designed for service within a housing restricting heat transfer to the external medium. 103

enclosed switchgear assembly (power switchgear). One that is enclosed on all sides and top. 103

enclosed ventilated (rotating machinery). A term applied to an apparatus with a substantially complete enclosure in which openings are provided for ventilation only. *See:* **asynchronous machine.** 63

enclosed ventilated apparatus. Apparatus totally enclosed except that openings are provided for the admission and discharge of the cooling air. *Note:* These openings may be so arranged that inlet and outlet ducts or pipes may be connected to them. An enclosed ventilated apparatus or machine may be separately ventilated or self-ventilated. 328

enclosure (1)(metal-enclosed bus and calculating losses in isolated-phase bus). A surrounding case or housing used to protect the contained conductor and prevent personnel from accidentally contacting live parts. 574

(2)(power and distribution transformer). A surrounding case or housing used to protect the contained equipment and prevent personnel from accidentally contacting live parts. 53

(3)(power system communication equipment). A surrounding case or housing to protect the contained equipment against external conditions and to prevent personnel from accidentally contacting live parts. 453

(4) (general). A surrounding case or housing used to protect the contained conductor or equipment and prevent personnel from accidentally contacting live parts. *Note:* Material and finish shall conform to the standards for the switchgear enclosed. 202,78

(5) (Class 1E equipment and circuits)(nuclear power generating stations). An identifiable housing such as a cubicle, compartment, terminal box, panel, or enclosed raceway used for electrical equipment or cables. 131

(6) (National Electrical Code). The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage. 256

(7) (power switchgear). A surrounding case or housing used to protect the contained equipment and to prevent personnel from accidentally contacting live parts. *Note:* Material and finish conform to the standard for the switchgear enclosed. 103

encode (1) (general). To express a single character or a message in terms of a code. 235

(2) (electronic control). To produce a unique combination of a group of output signals in response to each of a group of input signals. 235

(3) (computing systems). To apply the rules of a code. *See:* **code; decode; matrix; translate.** 255,77

encoder (electronic computation). A network or system in which only one input is excited at a time and each input produces a combination of outputs. *Note:* Sometimes called matrix. 210

end (Class 5) office (EO)(telephone loop performance). A switching system to which customer premises equipment is directly connected by loops. The switch connects loops to loops and loops to trunks. 473

end-around carry (computing systems). A carry generated in the most significant place and forwarded directly to the least significant place, for example, when adding two negative numbers, using nines complement. *See:* **carry.** 235

end bell. *See:* **cable terminal.**

end bracket (rotating machinery). A beam or bracket attached to the frame of a machine and intended for supporting a bearing. 63

end capacitor (antennas). A conducting element or group of conducting elements, connected at the end of a radiating element of an antenna, to modify the current distribution on the antenna, thus changing its input impedance. 111

end cells (storage battery) (storage cell). Cells that may be cut in or cut out of the circuit for the purpose of adjusting the battery voltage. *See:* **battery (primary or secondary).** 328

end device (of a telemeter) (power switchgear). The final system element that responds quantitatively to the measurand through the translating means and performs the final measurement operation. *Note:* An end device performs the final conversion of measurement energy to an indication, record, or the initiation of control. 103

end distortion (data transmission). The shifting of the end of all marking pulses from their proper positions in relation to the beginning of the start pulse, of telegraph signals. 59

end finger (outside space-block) (rotating machinery). A radially extending finger piece at the end of a laminated core to transfer pressure from an end clamping plate or flange to a tooth. *See:* **rotor (rotating machinery); stator.** 63

end-fire array antenna. A linear array antenna whose direction of maximum radiation lies along the line of the array. 111

end fittings (composite insulators). The insulator attachment hardware that is connected to the core. 483

end injection (Charles or Kino gun (EI)) (microwave tubes). A gun used in the presence of crossed electric and magnetic fields to inject an electron beam into the end of a slow-wave structure. *See:* **microwave tube.** 190

end-of-block signal (numerically controlled machines). A symbol or indicator that defines the end of one block of data. 224,297

end-of-copy signal (facsimile). A signal indicating termination of the transmission of a complete subject copy. *See:* **facsimile signal (picture signal).** 12

end office (telephone switching systems). A local office that is part of the toll hierarchy of World Zone 1. An end office is classified as a Class 5 office. *See:* **office class.** 55

end of program (numerically controlled machines). A miscellaneous function indicating completion of workpiece. *Note:* Stops spindle, coolant, and feed after completion of all commands in the block. Used to reset control and/or machine. Resetting control may include rewinding of tape or progressing a loop tape through the splicing leader. The choice for a particular case must be defined in the format classification sheet. 224,207

end of tape (numerically controlled machines). A miscellaneous function that stops spindle, coolant, and feed after completion of all commands in the block. *Note:* Used to reset control and/or machine. Resetting control will include rewinding of tape, progressing a loop tape through the splicing leader, or transferring to a second tape reader. The choice for a particular case must be defined in the format classification sheet. 54

end-on armature relay. *See:* **armature, end-on; relay.**

end plate, rotor (rotating machinery). An annular disk (ring) fitted at the outer end of the retaining ring. 63

end-play washers (rotating machinery). Washers of various thicknesses and materials used to control axial position of the shaft. 63

end-point criterion (evaluation of thermal capability) (thermal classification of electric equipment and electrical insulation). A value of property or property degradation (either absolute or percentage change) which defines failure in a functional test. 506

end rail (rotating machinery). A rail on which a bearing pedestal can be mounted. *See:* **bearing.** 63

end ring, rotor (rotating machinery). The conducting structure of a squirrel-cage or amortisseur (damper) winding that short-circuits all of the rotor bars at one end. *See:* **rotor (rotating machinery).** 63

end-scale value (electric instrument). The value of the actuating electrical quantity that corresponds to end-scale indication. *Notes:* (1) When zero is not at the end or at the electrical center of the scale, the higher value is taken. (2) Certain instruments such as power-factor meters, ohmmeters, etcetera, are necessarily excepted from this definition. (3) In the specification of the range of multiple-range instruments, it is preferable to list the ranges in descending order, as 750/300/150. *See:* **accuracy rating (instrument); instrument.** 280

end shield (1) (rotating machinery). A solid or skeletal structure, mounted at one end of a machine, for the purpose of providing a specified degree of protection for the winding and rotating parts or to direct the flow of ventilating air. *Note:* Ordinarily a machine has an end shield at each end. For certain types of machine, one of the end shields may be constructed as an integral part of the stator frame. The end shields may be used to align and support the bearings, oil deflectors, mum costs for the system over a predetermined time interval. 516

hyperabrupt junction (semiconductor)(nonlinear, active, and nonreciprocal waveguide components). A specially designed p-n junction that provides a greater capacitance change over a given voltage range than does an abrupt junction. These devices offer a linear frequency versus voltage characteristic over a limited voltage range whenused in a voltage controlled oscillator. The slope of a log-log plot of abrupt-junction capacitance versus voltage is 0.5, whereas a hyperabrupt junction has a slope between 0.5 and 2.0 in the hyperabrupt voltage region. 530

hysteresis coupling (electric coupling). An electric coupling in which torque is transmitted by forces arising from the resistance to reorientation of established magnetic fields within a ferromagnetic material. 416

hysteresis loss (magnetic) (power and distribution transformer). The energy loss in magnetic material which results from an alternating magnetic field as the elementary magnets within the material seek to align themselves with the reversing magnetic field. 53

I

IA. *See:* **laser gyro axes.**

IAGC. *See:* **instantaneous automatic gain control.**

ice detection light (illuminating engineering). An inspection light designed to illuminate the leading edge of the wing to check for ice formation. 167

iceproof (high voltage air switches, insulators, and bus supports). So constructed or protected that ice will not interfere with successful operation. 575

ice proof (power switchgear). So constructed or protected that ice of a specified composition and thickness will not interfere with successful operation. 103

I chrominance signal (National Television System Committee (NTSC) color television). The sidebands resulting from suppressed-carrier modulation of the chrominance subcarrier by the I video signal. *Note:* The signal is transmitted in vestigial form, the upper sideband being limited to a frequency within the top of the picture transmission channel (approximately 0.6 MHz above the chrominance subcarrier), and the lower sideband extending to approximately 1.5 MHz below the subcarrier. The phase of the signal, for positive I video signals, is 123deg with respect to the (B-Y) axis. 18

ICI*. *See:* **CIE.**

*Deprecated

ICW. *See:* **interrupted continuous wave.**

ideal capacitor (nonlinear capacitor). A capacitor whose transferred charge characteristic is single-valued. *See:* **nonlinear capacitor.** 191

ideal dielectric. *See:* **dielectric, perfect.**

ideal filter (circuits and systems). (1) (frequency domain) A filter that passes, without attenuation, all frequencies inside specified frequency limits while rejecting all other frequencies. (2) (time domain) A filter with a time domain response identical to the excitation except for a constant delay. 67

ideal noise diode. *See:* **noise diode, ideal.**

ideal paralleling (rotating machinery). Paralleling by adjusting the voltage, and frequency and phase angle for alternating-current machines, such that the conditions of the incoming machine are identical with those of the system with which it is being paralleled. *See:* **asynchronous machine.** 63

ideal transducer. *See:* **transducer, ideal.**

ideal value (1) (control systems: general) (control) (industrial control) (automatic control). The value of a selected variable that would result from a perfect system operating from the same command as the actual system under consideration. *See:* **control system, feedback.** 206

(2) (synchronous-machine regulating system). The value of a controlled variable (for example, generator terminal voltage) that results from a desired or agreed-upon relationship between it and the commands (commands such as voltage regulator setting, limits, and reactive compensators). 63

idenitified (as applied to equipment) (National Electrical Code). Recognizable as suitable for the specific purpose, function use, environment, application, etcetera, where described in a particular Code requirement. *See: equipment.* (FPN) Suitability of equipment for a specific purpose, environment or application may be determined by a qualified testing laboratory, inspection agency, or other organization concerned with product evaluation. Such identification may include labeling or listing; labeled; listed; Section 90-6 of the NEC. 256

identification (radar). The knowledge that a particular radar return signal is from a specific target. This knowledge may be obtained by determining size, shape, timing, position, maneuvers, rate of change of any of these parameters, or by means of coded responses through secondary radar. 13

identification beacon (navigation aid terms). A beacon that transmits coded signals to identify a geographic position. 526

identifier (software). (1) A symbol used to name, indicate, or locate. Identifiers may be associated with such things as data structures, data items,or program locations. (2) A character or group of characters used to identify or name an item of data and possibly to indicate certain properties of that data. *See:* **data; data structure; program.** 434

identity friend or foe (IFF). Equipment used for transgonal auto-correlation property. In space communications commonly used for synchronization and ranging. 84

pseudorandom number sequence. A sequence of numbers, determined by some defined arithmetic process, that is satisfactorily random for a given purpose, such as by satisfying one or more of the standard statistical tests for randomness. Such a sequence may approximate any one of several statistical distributions, such as uniform distribution or normal Gaussian distribution. 255, 77

PSK. *See:* **phase-shift keying.**

psychometric chroma (illuminating engineering). A correlate of perceived chroma defined in terms of CIELUV or CIELAB. Equal scale intervals correspond approximately to equal differences in perceived chroma. 167

psychometric hue-angle (illuminating engineering). A correlate of hue defined in terms of CIELUV or CIELAB. 167

psychometric lightness (illuminating engineering). A correlate of lightness defined in terms of CIELUV or CIELAB. Equal scale intervals correspond approximately to equal differences in (perceived) lightness. 167

psychometric saturation (illuminating engineering). A correlate of saturation defined in terms of CIELUV. Equal scale intervals correspond approximately to equal differences of (perceived) saturation. *Note:* Psychometric saturation cannot be calculated in terms of CIELAB. 167

PTM. *See:* **pulse-time modulation.**

p-type crystal rectifier. A crystal rectifier in which forward current flows when the semiconductor is positive with respect to the metal. *See:* **rectifier.** 328

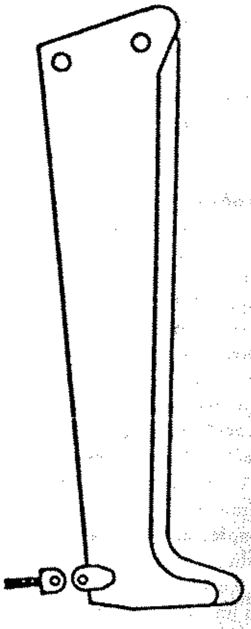
p-type semiconductor. *See:* **semiconductor, *p-type*.**

public-address system. A system designed to pick up and amplify sounds for an assembly of people. 328

public telecommunications exchange (telephone switching systems). A telecommunications exchange that serves the public. 55

public telephone station (pay station). A station available for use by the public, generally on the payment of a fee that is deposited in a coin collector or is paid to an attendant. *See:* **telephone station.** 328

pull blade (cable plowing). A plow blade used to pull direct burial conductors into position by means of a suitable pulling grip attachment at the heel of the blade. 52



Pull blade.

pull box. A box with a blank cover that is inserted in one or more runs of raceway to facilitate pulling in the conductors, and may also serve the purpose of distributing the conductors. *See:* **cabinet.** 328

pulley (sheave) (rotating machinery). A shaft-mounted wheel used to transmit power by means of a belt, chain, band, etcetera. *See:* **rotor (rotating machinery).** 63

pulling eye. A device that may be fastened to the conductor or conductors of a cable or formed by or fastened to the wire armor and to which a hook or rope may be directly attached in order to pull the cable into or from a duct. *Note:* Pulling eyes are sometimes equipped, like test caps, with facilities for oil feed or vacuum treatment. 64

pulling figure (oscillator). The difference between the maximum and minimum values of the oscillator frequency when the phase angle of the load-impedance reflection coefficient varies through 360 degrees, while the absolute value of this coefficient is constant and equal to a specified value, usually 0.20. (Voltage standing-wave ratio 1.5.) *See:* **oscillatory circuit; waveguide.** 125

pulling into synchronism (rotating machinery). The process of synchronizing by changing from asynchronous speed to synchronous. 63

pulling iron (NESC). An anchor secured in the wall, ceiling, or floor of a manhole or vault to attach rigging used to pull cable. 494

pulling line (conductor stringing equipment). A high strength line, normally synthetic fiber rope or wire rope, used to pull the conductor. However, on reconstruction jobs where a conductor is being replaced, the old conductor often serves as the pulling line for the new conductor. In such cases, the old conductor must be closely examined for any damage prior to the pulling operation. *Syn:* **bull line; hard line; light line; sock line.** 431

pulling out of synchronism (rotating machines). The process of losing synchronism by changing from synchronous speed to a lower asynchronous speed (for a

motor) or highe
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pulling tension (
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pulling vehicle (c
piece of mobile
pilot lines, pullin
copters may be c
utilized for the s
pull-in test (synch
machine that is p
fied slip.
pull-in time (acqu
lite). The time re
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pull-in torque (sy
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connected inerti
voltage and frequ
plied. *Note:* The s
load depends on
whether the moto
speed depends on
that the pull-in to
having the Wk^2 as

pull or transfer box
within which one
cuits are connecte
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machine develops
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or tension site for t
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down torque occurs
frequency.
pulsating function.
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nor B is zero.
pulse (1) (impulse)
sion of a quantity f
(2) (relaying) (pow
of a quantity from i
(3) (automatic cont
value is normally co
ized by a rise and a

prevent metallic contact between plates of opposite polarity within the cell. (Perforated sheets are usually called retainers.) *See:* **battery (primary or secondary).** 328

(2) (computing systems). *See:* **delimiter.**

separator, insulation slot (rotating machinery). Insulation member placed in a slot between individual coils, such as between main and auxiliary windings. *See:* **rotor (rotating machinery); stator.** 263

sequence. *See:* **calling sequence; collating sequence; pseudorandom number sequence.**

sequence filter. *See:* **sequence network.**

sequence network (power switchgear). An electrical circuit that produces an output proportional to one or more of the sequence components of a polyphase system of voltages or currents, for example positive-sequence network, or zero-sequence network. 103

sequence number. A number identifying the relative location of blocks or groups of blocks on a tape. 207

sequence-number readout. Display of the sequence number punched on the tape. *See:* **block-count readout.** 207

sequence of events function. *See:* **supervisory control functions**

sequence of operation (packaging machinery). A written detailed description of the order in which electrical devices and other parts of the industrial equipment should function. 429

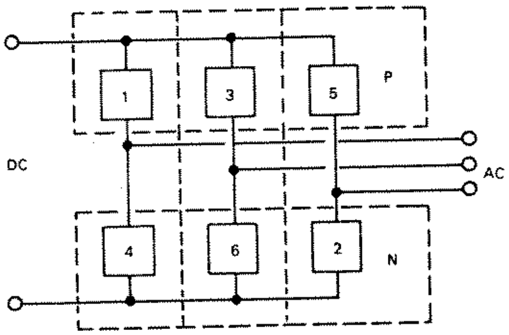
sequence switch. A remotely controlled power-operated switching device used as a secondary master controller. *See:* **multiple-unit control.** 328

sequence table (electric controller). A table indicating the sequence of operation of contactors, switches, or other control apparatus for each step of the periodic duty. *See:* **multiple-unit control.** 1

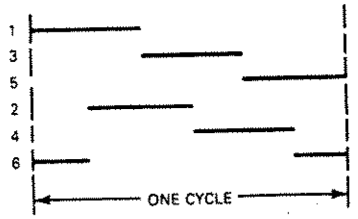
sequential (formatted system) (telecommunication). If the signal elements are transmitted successively in time over a channel, the transmission is said to be **sequential.** If the signal elements are transmitted at the same time over a multiwire circuit, the transmission is said to be **coincident.** *See:* **bit.** 194

sequential access (test, measurement and diagnostic equipment). A system in which the information becomes available in a one after the other sequence only, whether all of it is desired or not. 54

sequential commutation (circuit properties)(self-commutated converters). Commutation occurs from one to the next of three or more principal switching branches arranged as a multipulse group that conduct in cyclic sequential order for usually (but not always) equal time intervals. The commutation may be direct or indirect. *Note:* An example of a converter employing a sequential commutation is given in the figure below. 584



(a) Two 3-Pulse Commutating Groups: P, N



(b) Conducting Intervals of Principal Switching Branches 1–6

sequential control (computing systems). A mode of computer operation in which instructions are executed consecutively unless specified otherwise by a jump. 255, 77, 54

sequential events recording system (SERS). A system which monitors bistable equipment operations and process status and records changes of state in the order of detected occurrences. This monitoring may be accomplished using a device dedicated solely to this function, or using a multifunction system such as a data acquisition computer system. 48, 58

sequential lobing. *See:* **lobe switching.**

sequential logic function (graphic symbols for logic functions). A logic function in which there exists at least one combination of input states for which there is more than one possible resulting combination of states at the outputs. *Note:* The outputs are functions of variables in addition to the present states of the inputs, such as time, previous internal states of the element, etcetera. 451

sequential memory (sequential events recording systems). The memory which stores events in the same order in which they were received by the system. The memory capacity can be expressed as the number of events or levels. *See:* **event; level.** 48, 58

sequential operation. Pertaining to the performance of operations one after the other. 255, 77

sequential processes (software). Processes that execute in such a manner that one must finish before the next begins. *See:* **concurrent processes; process.** 434

sequential programming (test, measurement and diagnostic equipment). The programming of a device by which only one arithmetical or logical operation can be executed at one time. 54

sequential relay. A relay that controls two or more sets of contacts in a predetermined sequence. *See:* **relay.** 259

sequential scanning (television). A rectilinear scanning process in which the distance from center to center of successively scanned lines is equal to the nominal line width. *See:* **television.** 328

serial. (1) Pertaining to the time sequencing of two or more processes. (2) Pertaining to the time sequencing of two or more similar or identical processes, using the same facilities for the successive processes. (3) Pertaining to the time-sequential processing of the individual parts of a whole, such as the bits of a character, the characters of a word, etcetera, using the same facilities for successive parts. *See:* **serial-parallel.** 235

serial access (computing systems). Pertaining to the process of obtaining data from, or placing data into, storage when there is a sequential relation governing the access time to successive storage locations. 255, 77

serial by bit. *See:* **serial transmission.** 59

serial communication (supervisory control, data acquisition, and automatic control). A method of transmitting information between devices by sending all bits serially over a single communication channel. 570

serial digital computer. A digital computer in which the digits are handled serially. Mixed serial and parallel machines are frequently called serial or parallel according to the way arithmetic processes are performed. An example of a serial digital computer is one that handles decimal digits serially although it might handle the bits that comprise a digit either serially or in parallel. *See:* **parallel digital computer.** 210

serial operation (telecommunication) (data transmission). The flow of information in time sequence, using only one digit, word, line, or channel at a time. 59

serial-parallel. Pertaining to processing that includes both serial and parallel processing, such as one that handles decimal digits serially but handles the bits that comprise a digit in parallel. 235

serial transmission (data transmission) (telecommunications). Used to identify a system wherein the bits of a character occur serially in time. Implies only a single transmission channel. *Syn:* **serial by bit.** 59

series capacitor. A device that has the primary purpose of introducing capacitive reactance in series with an electric circuit. 474

series capacitor bank (series capacitors). An assembly of capacitors and associated auxiliaries, such as structures, support insulators, switches, and protective devices, with control equipment required for a complete operating installation. 474

series circuit. A circuit supplying energy to a number of devices connected in series, that is, the same current passes through each device in completing its path to the source of supply. *See:* **center of distribution.** 64

series circuit lighting transformer (power and distribution transformer). Dry-type individual lamp insulating transformer, autotransformer, and group series loop transformers for operation of incandescent or memory lamps on series lighting circuits such as for street and airport lighting. 53

series coil sectionalizer (power switchgear). A sectionalizer in which main circuit current impulses above a specified value, flowing through a solenoid or operating coil, provide the energy required to operate the counting mechanism. 103

series connected starting-motor starting (rotating machinery). The process of starting a motor by connecting its primary winding to the supply in series with the primary windings of a starting motor, this latter being short-circuited for the running condition. 63

series connection. The arrangement of cells in a battery made by connecting the positive terminal of each successive cell to the negative terminal of the next adjacent cell so that their voltages are additive. *See:* **battery (primary or secondary).** 328

series distribution system. A distribution system for supplying energy to units of equipment connected in series. *See:* **alternating-current distribution; direct-current distribution.** 64

series elements (network). (1) Two-terminal elements are connected in series when they form a path between two nodes of a network such that only elements of this path, and no other elements, terminate at intermediate nodes along the path. (2) Two-terminal elements are connected in series when any mesh including one must include the others. *See:* **network analysis.** 210

series-fed vertical antenna. A vertical antenna which is insulated from ground and whose feed line connects between ground and the lower end of the antenna. 111

series filter (harmonic control and reactive compensation of static power converters). That type of filter which reduces harmonics by putting a high series impedance between the harmonic source and the system to be protected. 533

series gap (1)(metal-oxide surge arresters for ac power circuits). An intentional gap(s) between spaced electrodes in series with the valve elements across which all or part of the impressed arrester terminal voltage appears. 583

(2)(surge arrester). An intentional gap(s) between spaced electrodes: it is in series with the valve or expulsion element of the arrester, substantially isolating the element from line or ground, or both, under normal line-voltage conditions. 430

series heater (electrical heat tracing for industrial applications). Heating elements that are designed to have a specific resistance at a given temperature for a given length. 523

series loading. Loading in which reactances are inserted in series with the conductors of a transmission circuit. *See:* **loading.** 328

series-mode interference (signal-transmission system). *See:* **interference, differential-mode.**

series modulation. Modulation in which the plate circuits of a modulating tube and a modulated amplifier